

REMARKS

In view of the following discussion, the Applicant submits that none of the claims now pending in the application is anticipated under the provisions of 35 U.S.C. § 102 or obvious under the provisions of 35 U.S.C. § 103. Thus, the Applicant believes that all of the pending claims are now in allowable form.

I. REJECTION OF CLAIMS 1-10 and 11-21 UNDER 35 U.S.C. § 102

Claims 1-10 and 11-21 stand rejected as being anticipated by Hui (US Patent 6,654,417, Issued on November 28, 2003). The Applicant respectfully disagrees.

Claim 11 is only discussed as being rejected by the Examiner under the provisions of 35 U.S.C. § 103. Applicant assumes that the Examiner inadvertently included claim 11 when listing the rejected claims under 35 U.S.C. § 102. As such, Applicant will limit discussion of claim 11 to the section related to the rejection of claims under 35 U.S.C. § 103.

Hui teaches a method and apparatus for encoding digital video utilizing a single pass variable bit rate encoding procedure. An encoding quality is set and the bit rate for encoding blocks or frames in the sequence of moving pictures is determined to achieve the selected quality according to the complexity of the video sequence. The bit rate is constrained by predetermined upper and lower bit rate limits.

The Examiner's attention is directed to the fact that Hui fails to teach or suggest computing a difference between the average quality measure and the picture quality measure of said current frame for producing a resultant value. Specifically, Applicant's claim 1 positively recites:

1. A method for adjusting a target bit rate for a frame, said method comprising the steps of:
 - (a) determining a picture quality measure of a current frame for a particular frame type;
 - (b) determining a picture quality measure for each of a plurality of immediately previous frames corresponding to said frame type of said current frame;
 - (c) computing an average picture quality measure from said picture quality measures of said plurality of immediately previous frames;

Page 2

PATENT

Atty. Dkt. No. SAR 13700

(d) computing a difference between the average picture quality measure and the picture quality measure of said current frame for producing a resultant value;

(e) comparing the resultant value to a threshold value for producing a comparing result; and

(f) adjusting said target bit rate in response to said comparing result. (emphasis added)

Applicant's other independent claims 11 and 12 recite similar subject matter to that which is emphasized above.

Applicant's invention is directed to a method and apparatus for temporally allocating bits between frames of an image sequence in a coding system such that temporal fluctuations are smoothed out. Namely, a picture quality is monitored on a frame by frame basis. The picture quality measure of a current frame is compared to an average picture quality measure. The use of an average picture quality measure enables the invention to code video to mitigate temporal anomalies in the picture quality that may otherwise not be corrected using a frame based quality measure.

The Examiner asserts that col. 12, lines 1-13 of Hui provides support that Hui teaches computing a difference between a picture quality measure of a current frame and an average picture quality measure. However, Applicant respectfully submits that the Examiner's assertion is incorrect. The particular passage cited in Hui reads as follows:

In this embodiment, the encoding quality 324 is determined by comparing the original input picture taken from input 300 and the locally decoded picture 325. Conventional methods such as the mean square error (MSE) or the signal-to-noise ratio (SNR) measures can be used as comparison. This measure is further compared at Frame Quality Measure 320 with the definable Target Quality 319. When the encoding quality is lower than the target quality, the target bitrate estimator 322 will set the target bitrate higher, on the other hand, if the encoding quality is higher than the target quality, the target bitrate is set lower. (col. 12, lines 1-12)

Clearly, this passage of Hui discloses comparing an original input picture to its locally decoded counterpart to determine a quality measure. There is no teaching or suggestion of computing a difference between a quality measure of a current frame and an average quality measure.

Page 3

290090_1

PATENT
Atty. Dkt. No. SAR 13700

As such, Hui fails to teach what is recited in the Applicant's independent claims 1 and 12. Claims 2-10 and 13-21 depend, either directly or indirectly from independent claims 1 and 12. Therefore, Applicant respectfully submits that claims 2-10 and 13-21 are patentable over Hui for at least the same reason that claims 1 and 12 are patentable over these references.

II. REJECTION OF CLAIM 11 UNDER 35 U.S.C. § 103

The Examiner has rejected claim 11 in the Office Action as being obvious over Hui in view of Sethuraman et al. (US patent 6,526,097, issued on February 25, 2003). The Applicant respectfully disagrees.

The Examiner concedes that Hui fails to disclose a computer-readable medium and cites Sethuraman to cure this deficiency. As argued above in Section I., Applicant asserts that Hui fails to teach or suggest computing a difference between the average quality measure and the picture quality measure of said current frame for producing a resultant value. Sethuraman discloses video encoding techniques that separate the functionality for controlling the higher-level (i.e., sequence-level) aspects of encoding video data from the functionality for implementing the lower-level (i.e., frame-level) encoding of individual video frames within the video sequence. Sethuraman's techniques enable video processing systems to be built modularly, where a video processing subsystem that controls the sequence-level processing can be configured with any of a variety of plug-in video encoders that control the frame-level processing that conform to the interface protocol of the subsystem. (see Sethuraman, col. 2, lines 27-38)

Sethuraman fails to cure the deficiencies of Hui. Neither of the references cited by the Examiner discloses computing a difference between the average picture quality measure and the picture quality measure of said current frame for producing a resultant value, as claimed by the Applicant. Thus, the Examiner has failed to present a prima facie case of obviousness in combining Hui with Sethuraman to arrive at the claimed invention of Applicant's claim 11. Therefore, the Applicant submits that claim 11 as it now stands, fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Withdrawal of the rejection is respectfully requested.

Page 4

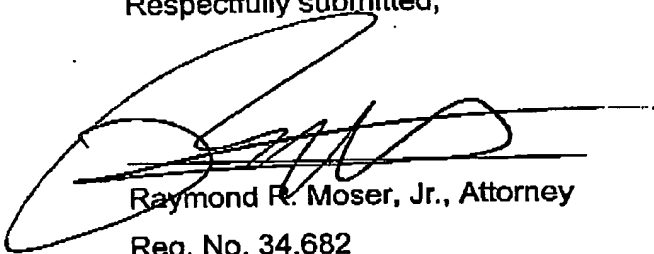
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PATENT
Atty. Dkt. No. SAR 13700**Conclusion**

Thus, the Applicant submits that all of these claims now fully satisfy the requirements of 35 U.S.C. §102 and 35 U.S.C. §103. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Thomas Bethea, Jr., Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

8-2-04
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Page 5

290090_1